

REMARKS

Status of the claims

Claims 1, 3, 6-7, and 15-16 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Reid (U.S. Patent No. 4,503,177), Mullis (U.S. Patent No. 5,436,115), Gordon (U.S. Patent No. 2,460,221), and Tomonaga (US Application Publication No. 2002/0114956). In addition, claims 4 and 5 stand rejected under 35 U.S.C. § 103 as allegedly being unpatentable over the above references in combination with Kamada (U.S. Patent No. 5,208,132). Claim 8 stands rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Reid, Mullis, Gordon, and Tomonaga.

Response to claim rejections

Applicants respectfully submit that it would not be obvious to combine the references in the manner set forth in the Office Action, and that therefore the presently claimed invention is not rendered obvious by the cited references.

With respect to Reid, Reid discloses a photochromic compound which retains a colored state through the use of a fulgide. However, the fulgide in Reid is changed to a non-colored state by heating it. Because the fulgide is necessary to improve the stability of the colored state in Reid, the compound composites a clay mineral which has an expanding crystal lattice.

Conversely, the presently claimed invention relates to a toy having a stable colored state and a decolorized state, which may be visibly alternatively identified by using a diaryl ethene photochromic compound with excellent heating irreversibility, excellent repeating durability, excellent long wavelength area receptivity, and excellent high sensibility.

Reid does not disclose or teach a specific way in which the colored state of the fulgide is changed into the discolored state. The combination of the presently recited color-changing means and a toy is not disclosed in Reid, in which the color-changing means includes an ultraviolet ray absorbent and/or a light-shielding pigment capable of shielding ultraviolet rays.

Mullis does not remedy the deficiencies in Reid, in part because Mullis discloses an irreversible color change, and also because Mullis discloses a photoacid progenitor compound which undergoes a reaction into a photoacid when it is radiated by ultraviolet rays. The photochemical reaction system in Mullis responds to ultraviolet rays by changing the color of the dyestuff via acidification.

In Mullis, a dyestuff that changes color based on pH is used as a pH indicator. A dyestuff of bromthymol blue changes color to blue in alkaline pH's, green in neutral pH's, and yellow in acidic pH's. It is a system in Mullis that visibly identifies a cumulative amount of ultraviolet rays. The system utilizes the photoacid progenitor, which may change to a photoacid as discussed above, and also changes the color of the dyestuff so that the pH shifts to an acidity range which is radiated by the ultraviolet ray, thereby visibly identifying the radiation amount by color. For example, bromthymol blue is used as the indicator dyestuff, which is blue at first, then yellow-green after fifteen minutes of sunlight, and then yellow after sixty minutes of sunlight. The elapsed time in sunlight is determined by the color. Therefore, the color change of the photochemical reaction system of Mullis is irreversible.

Mullis uses a common pH indicator which reversibly changes the color by pH. However, this does not correspond to the presently claimed invention because the (irreversible) photochemical reaction system in Mullis is made by adding a photoacid progenitor compound.

Further, there is no reason to combine Mullis and Reid. There is no reason to add the irreversible indicator system in Mullis to Reid.

With respect to Gordon, Gordon discloses a luminescent amusement device that contains a light sensitive layer containing a light accumulating material, such as a zinc sulfide. However, Applicants provide examples of why Gordon, and the zinc sulfide material therein, in combination with the other cited references, does not render obvious the presently claimed invention.

Applicants attach herewith Figs. 1-4, which compare a printing ink having the presently recited diaryl ethene photochromic compound with a printed material made using a printing ink containing zinc sulfide, such as that disclosed within Gordon. The original color Figures will be made artifacts to the present application.

As can be seen from the Figures, when the printed material is exposed to sunlight, the picture having the diaryl ethene photochromic compound is visibly identified clearly. However, the picture having the zinc sulfide is not visibly identifiable. See Fig. 1. Conversely, when a sheet having an ultraviolet ray absorbent is put on top of the printed material and is exposed to sunlight, the picture having the diaryl ethene photochromic compound is not visibly identifiable. See Fig. 2.

When a red sheet, as described in Gordon, is put on top of the printed material in Fig. 1 and exposed to sunlight, the picture having the zinc sulfide does not change and is not visibly identifiable as anything. See Fig. 3. On the other hand, after the printed material is exposed to sunlight, the picture having zinc sulfide is visibly identifiable upon viewing in a dark place. See Fig. 4.

Accordingly, Gordon, in view of the cited references, does not render obvious the presently claimed invention.

Finally, Applicants respectfully note that Tomonaga does not remedy the deficiencies set forth above. Further, Tomonaga does not teach or suggest the use of a toy with the photochromic compound therein.

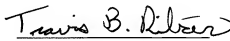
Accordingly, Applicants respectfully request the reconsideration and withdrawal of these 103 rejections.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,


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